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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/562,050

12/23/2005

Lachezar Komitov

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EXAMINER

HON, SOW FUN

ART UNIT

PAPER NUMBER

1794

NOTIFICATION DATE

DELIVERY MODE

07/02/2008

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ADIPFDD@bipc.com

<b>Office Action Summary</b>	<b>Application No.</b> 10/562,050	<b>Applicant(s)</b> KOMITOV ET AL.	
	<b>Examiner</b> SOPHIE HON	<b>Art Unit</b> 1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 13 March 2008.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4 and 6-19 is/are rejected.
- 7) ☒ Claim(s) 5.20 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Response to Amendment***

1. The 35 U.S.C. 112, 2nd paragraph rejection of claims 6-7, 9-10, 12 is withdrawn due to Applicant's amendment dated 3/13/08.

### ***Response to Request for Reconsideration***

#### ***Rejections Repeated***

2. The 35 U.S.C. 102(e) and 103(a) rejections over Miyachi as the primary reference, are repeated for the same reasons previously of record in the Office action dated 12/17/07.

#### ***Response to Arguments***

3. Applicant's arguments regarding the valid use of Miyachi have been fully considered but they are not persuasive.
4. Applicant argues that the phrase "directly controllable by an electric field via dielectric coupling" means that the initial orientation will be affected as a result of the dielectric coupling between the electric field and the molecule, i.e. the side-chains of the surface director alignment layer and the liquid crystal bulk layer, and that when there is dielectric coupling between the electric field and the molecule, i.e. the side-chains of the surface director alignment layer and the liquid crystal bulk layer, and that when there is dielectric coupling between a liquid crystal molecule and an electric field, the director of the liquid crystal molecules aligns to the electric field, which means that the dielectric coupling allows so-called out-of-plane switching of the liquid crystal molecules which are arranged between two opposing substrates and the electrical field is arranged across

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the display from the first substrate to the second substrate. Applicant argues that since Miyachi teaches that the electric field is applied over the liquid crystal layer and the first and second switching layers in a direction essentially along the normal to the substrate, wherein the only type of switching is in the plane of the surface of the liquid crystal layer, perpendicular to the applied field, [and fails to teach that the switching can also occur out-of-plane, Miyachi does not teach that the orientation of the liquid crystal molecules is directly controlled by dielectric coupling.

Applicant is respectfully apprised that Miyachi does indeed teach that switching can also occur out of the plane of the liquid crystal layer when liquid crystal of positive [dielectric] anisotropy is present (switching outside of the plane as being affected by the voltage applied. That is to say, the liquid crystal molecules will also change their orientation directions in a plane that is not parallel to the surface of the liquid crystal layer, column 14, lines 14-26). Thus, Miyachi does teach that the orientation of the liquid crystal molecules is directly controlled by dielectric coupling.

5. Applicant argues that Miyachi only teaches ferroelectric or antiferroelectric or ferrielectric coupling, since even if there were any such dielectric coupling, upon application of an electric field, the orientation of the switching layer is controlled by ferroelectric coupling, which time constant is much lower than the time constant for dielectric coupling.

Applicant is respectfully apprised that Miyachi teaches that both the surface-director alignment layer and the underlying alignment layer preferably include a functional group with a great dipole moment (column 11, lines 50-59) wherein the

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functional group with great dipole moment is a ferroelectric liquid crystal side-chain (column 15, lines 10-17, ferroelectric liquid crystal material, polymerizable compound, for switching layer, column 12, lines 24-30), the orientation of which is directly controllable by an electric field (change orientation direction in response to a voltage applied, column 6, lines 7-10) easily realized by the interactions between the dipoles (column 11, lines 55-59). Interaction between dipoles is dielectric coupling.

Additionally, ferroelectric coupling is a species of dielectric coupling. The feature that Applicant relies upon, namely the "time constant", is not recited in the present claims. Thus, Miyachi does teach orientational change of the switching layer that is due to the dielectrical coupling to the electric field, as presently claimed.

6. Applicant argues that since Miyachi fails to disclose the sign of the dielectric anisotropy of the surface-director alignment layer, Miyachi never discloses any orientational change of the switching layer that would be due to the dielectrical coupling to the electric field.

Applicant is respectfully apprised that while Miyachi fails to disclose the absolute sign of the dielectric anisotropy of the surface-director alignment layer for any given embodiment, Miyachi does teach that the first surface-director alignment layer and the second surface-director alignment layer exhibit opposite signs of dielectric anisotropy (molecule 16a in the one switching layer 16 and the molecule in the other switching layer 26 behave as having mutually opposite spontaneous polarizations towards an applied voltage with a polarity, column 8, lines 54-57). Thus, Miyachi teaches in one embodiment, that the liquid crystal bulk layer and the first surface-

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director alignment layer exhibit dielectric anisotropies of opposite signs, while the liquid crystal bulk layer and the second surface-director alignment layer exhibit dielectric anisotropies of the same sign, since the second surface-director alignment layer exhibits the opposite sign of dielectric anisotropy to the dielectric anisotropy of the first surface-director alignment layer. Miyachi teaches that both the surface-director alignment layer and the underlying alignment layer preferably include a functional group with a great dipole moment (column 11, lines 50-59) wherein the functional group with great dipole moment is a ferroelectric liquid crystal side-chain (column 15, lines 10-17, ferroelectric liquid crystal material, polymerizable compound, for switching layer, column 12, lines 24-30), the orientation of which is directly controllable by an electric field (change orientation direction in response to a voltage applied, column 6, lines 7-10) via dielectric coupling (easily realized by the interactions between the dipoles, column 11, lines 55-59). Thus, Miyachi does teach orientational change of the switching layer that is due to the dielectrical coupling to the electric field.

7. Applicant's arguments regarding Robinson are directed towards the valid use of Miyachi as the primary reference, which are addressed above.

***Conclusion***

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication should be directed to Sow-Fun Hon whose telephone number (571)272-1492. The examiner can normally be reached Monday to Friday from 10:00 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Keith Hendricks, can be reached on (571)272-1401. The fax phone number for the organization where this application or proceeding is assigned is (571)273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

*/Sophie Hon/*

Sow-Fun Hon

/KEITH D. HENDRICKS/  
Supervisory Patent Examiner, Art Unit 1794